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Participative Approaches to White-Collar Productivity Improvement

U.S. Department of Labor
Bureau of Labor-Management
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U.S. Department of Labor
William E. Brock, Secretary

Bureau of Labor-Management Relations
and Cooperative Programs
John R. Stepp, Acting Deputy Under Secretary
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I. Introduction

White-collar workers—those classified as executives and managers; professionals; and sales, administrative, and support personnel—today account for some 55 percent of the work force, according to the Bureau of Labor Statistics (BLS), and some observers say that figure could rise to 90 percent by the turn of the century.

In recent years employment has grown most rapidly in fields classified by the Bureau of the Census as managerial and professional. Ranks of executive, administrative, and managerial workers grew almost 50 percent between 1973 and 1984, while jobs for operators, fabricators, and laborers actually declined over 7 percent during the same period.

The four occupations the BLS expects to grow fastest in the next decade are all white-collar. BLS predicts that by the mid-1990s, there will be 98 percent more paralegal personnel in this country, 72 percent more computer programmers, 69 percent more computer systems analysts, and 62 percent more medical assistants.

Most of the jobs for which the government predicts decline, by contrast, are blue-collar: by 1995, the BLS predicts there will be 31.5 percent fewer shoe sewing machine operators and tenders; 20.9 percent fewer furnace, kiln, or kettle operators and tenders; and 15.7 percent fewer textile machine operators, tenders, and set-up operators.

And this decline in so-called "direct labor" jobs is not always explained by decline in certain industries. A 1986 study of the electronics industry, for example, found that jobs for production workers fell while total employment in the industry grew. Job growth was in segments of the electronics industry that are heavily white-collar and becoming more so, as Table 1 demonstrates.

This increasing proportion of "indirect" or "white-collar" or "nonproduction" workers is true of manufacturing industries across the board. Since the end of World War II, the percentage of nonproduction workers in the manufacturing sector has almost doubled, from 15.2 percent of total manufacturing industry employment to 29.7 percent. In some industries, the figure is even more striking. As of 1983, nonproduction workers represented 44.5 percent of employees in chemicals and allied products, for example.

And these are expensive workers. As Peter Drucker pointed out in the *Wall Street Journal* in late 1985, the wage bill for white-collar workers in the automobile industry is almost equal to that industry's wage bill for blue-collar workers, even though white-collar employment in the industry is only about 25 percent of the total.

Another way to approach the issue is by examining the relative change in productivity of the manufacturing and service sectors of the economy, keeping in mind that the service sector includes such professions as accountancy, medicine, and law as well as the personal services that usually spring to mind, such as housekeeping.

This service sector of the economy has been growing rapidly. Between 1974 and 1984, employment in manufacturing declined from 26 to 21 percent of the nonagricultural work force. Between 1970 and 1984, manufacturing jobs grew only 1.2 percent, while service sector jobs grew 46.4 percent. Gregory Ross of the Coalition of Service Industries points out that, had job growth in the service sector been as small as job growth in manufacturing, this country's 1984 unemployment rate would have been 26.2 percent, not the actual 7.5 percent.

And BLS projections to the middle of the next decade expect nine out of ten new jobs created to be

Table 1

Industry	Number of Employees		
	1974	1984	1985, first half
Consumer electronics	113,600	71,800	68,400
Microelectronics	148,300	273,000	283,300
Computers and peripherals	217,000	460,900	456,900
	Percent Production Workers		
	1974	1984	1985, first half
Consumer electronics	74	68	66
Microelectronics	51	43	41
Computers and peripherals	39	37	35

Source: *Monthly Labor Report*, February 1986

in services, in such heavily white-collar fields as communications, trade, finance, insurance, real estate, and government.

But while job growth in the service sector has been robust, productivity growth in services is another matter.

During the 12 months ending in June 1986, for example, labor productivity in manufacturing rose 1.9 percent, while service sector productivity grew not at all.

Service sector productivity has been a check on overall U.S. productivity growth for almost ten years: If labor productivity in 1977 is equal to 100, by 1985 manufacturing productivity had risen to almost 120, while service sector productivity had risen to only 107.

Since productivity growth is, ultimately, the only way to expand the economic pie, long-term consequences of poor productivity performance are profound. Commenting on the U.S. productivity lag, the Institute for Social Research of the University of Michigan remarked in the first quarter 1986 issue of *Economic Outlook USA*, "Over long spans of time, differentials of one or two percentage points in productivity growth add up to the difference between our national ability to solve a great many pressing economic, social, and political problems and our ability to do much more than decry their existence."

Given the urgency, why has white-collar work been so resistant to productivity improvement?

Barriers to White-Collar Productivity Improvement

Several attributes of white-collar work differentiate it from traditional blue-collar work and make it more resistant to the usual approaches to productivity improvement.

First, the "output" of white-collar workers is more difficult to quantify. In contrast to a production worker assembling automobiles, a white-collar worker's "output" may take the form of an internal report or even verbal advice, rather than a salable product. This has sometimes led to the misconception that white-collar workers are repositories of expertise, in specialized fields such as accounting or biology, who don't produce actual output. Carl Thor, senior vice president for measurement at the American Productivity Center, says new output "counters" are needed when studying the productivity of research scientists, computer programmers, and other professional people.

Second, white-collar workers frequently deliver their products internally, rather than to a final customer outside the corporation. They may produce building blocks with which other people produce a finished product or service for the outside world. An automotive engineer's designs, for instance, are passed on to the company which in turn converts them into a finished car for a customer.

Third, white-collar workers more typically work in groups, depend on others to produce a "final" product, and must interact with many other parts of the organization to accomplish their work. A surgeon's "output" may be an open-heart operation, but he depends on teams of nurses and aides, lab technicians, and rehabilitation specialists to make his patient whole again. Aspects of his work may be routine and repetitive, but it also calls for considerable judgment, creativity, and specialized knowledge and training.

Finally, white-collar workers enjoy a great deal more discretion on the job than do blue-collar workers. Attorneys, for example, are far freer to prioritize their work than assembly-line workers. While there are many tasks performed by white-collar workers that can be as routine and repetitive as industrial work, much is not.

These are among the reasons why white-collar productivity resists improvement by traditional engineering techniques. For example, work measurement and methods analysis have been tried in white-collar settings. But these techniques are most applicable to the routine, repetitive elements of white-collar work. In fact, they can be quite helpful in speeding up transaction processing and paperwork flow. But work measurement and methods analysis are far less useful for measuring significant aspects of complex, nonroutine work. Work measurement was developed precisely for situations in which the same tasks are performed again and again to produce long runs of identical products. While work measurement may be useful in situations such as check processing in banks, it becomes irrelevant in more "creative" situations such as scientific research or new product design.

Nor has automation, which has had a large impact on improving productivity in manufacturing, been nearly so successful in the office. Offices are designed around paper flow, as if paper were the product of the office, not ideas and information. Thus, we have succeeded in generating more and more paper more and more quickly, but have not addressed the substance. Paper can be treated sequentially, like a product, but ideas are nonsequential.

Producing an annual report, for example, typically entails collaborative efforts among writers, photographers, and designers. But the work is not done sequentially—the text written, then the photographs taken, then both handed on to the designer. More likely, writer, photographer, and designer work simultaneously, probably meet at regular intervals to check progress, and ensure each one's work achieves a proper "fit" with the others'.

A New Approach

In contrast to work measurement and methods analysis, a more meaningful approach to improving white-collar productivity focuses on major *outcomes* of work, not just the tasks performed in support of those outcomes. For example, a personnel or human resources department may perform such tasks as processing employment applications, placing help-wanted ads, interviewing job candidates. These are tasks or activities. But what is the main outcome of those activities? Most probably it could be stated as "delivering high-quality employees or job candidates to other departments in company X." There is nothing wrong with finding methods to improve the speed with which those tasks are performed, but it is more to the point to find ways to improve the quality of the outcome.

Another example: Preparing lines of code, writing documentation, and determining specifications are some activities that a management information systems staff might perform. However, "developing software programs for corporate staff to monitor and analyze business information" is a *service* those activities support.

In fact, one major difference between an activity and a service is that an activity is unlikely to have value to the user or client. It has worth only when combined with other activities to produce a desired output or service. Running computer reports from a mainframe is an activity, but, unless the end result of the activity is a report useful to the client, running the tapes is of no value.

This perspective on white-collar work as work that entails delivering products or services to users or customers also leads to better ways of measuring productivity.

All too often productivity measurement in white-collar settings has taken a traditional approach drawn from manufacturing: transactions processed per hour, engineering drawings completed per month, and so on.

A more fruitful approach identifies important services or outcomes and develops a group of measures focused on quality and timeliness of service as well as efficient use of resources. A group, or family, of measures is needed because most white-collar work is too complex to be captured by one measure.

In the case of the personnel department mentioned above, a family of measures might include traditional efficiency measures such as speed with which paperwork is processed. But it also ought to include measures that address the issue of whether the department is in fact delivering good people to the organization. For example, if it is safe to assume that better screening of job candidates will reduce the turnover rate, then the turnover rate could be among legitimate measures of the personnel department's performance.

White-collar workers, because they are usually well-educated and perform creative, mentally demanding work, are apt to resist measurement of their productivity, arguing that what they do is too varied, too changing, too creative and judgmental to be subjected to strict measurement.

The following pages describe a two-year effort to test an alternate approach to measuring and increasing white-collar productivity. Developed by the American Productivity Center in Houston, Texas, this approach employs a six-phase methodology in which white-collar workers examine what they do, define the main services they provide, devise systems of measurement appropriate to themselves, and then examine what technology—typically computers—will help them perform better. The focus tends to be on the *effectiveness* of work—how well it serves the needs of its users and customers—not just the *efficiency* with which it is performed.

II. The American Productivity Center Methodology

From 1983 to 1985, the American Productivity Center conducted a research project that tested a six-phase methodology for improving productivity in the white-collar workplace.

The research involved a changed perspective on productivity improvement, focusing on outcomes as opposed to output, on quality and timeliness—effectiveness, not mere efficiency. Above all, the research aimed to demonstrate that the work of professionals, including engineers, human resources and information systems specialists, and scientific researchers, could in fact be measured.

The six-phase methodology developed by the Center was tested in 56 pilot groups in 13 major American organizations.

The first step of the methodology is a "scouting mission" in which work groups are selected to implement or "pilot" the six phases of the improvement process. There are two reasons for conducting a pilot project. First, it introduces the organization to the methodology, often to the whole notion of using participative methods to improve productivity. Second, if successful, the pilot group provides an initial success story that can become a rallying point for the larger organization.

Size: A pilot group should number between 25 and 200 persons in a coherent functional unit such as an accounting department. Too small a pilot group would probably not have sufficient visibility or impact on the larger organization. On the other hand, too large a pilot group would probably be difficult to manage through the change process: Getting a large group of people to train in the methodology and remain active in its implementation could prove cumbersome.

Complexity: The group may provide many services. For example, a human resources pilot group might involve people from the training function, from recruiting, and from compensation and benefits. One aim of the methodology is to force such a group to examine how it can perform better as a unit. But the pilot group should have a recognizable management team responsible for all its activities.

Potential: There should be real potential for improvement resulting both from change within the group and in its working interactions with other work groups. This helps assure that the needed initial success will occur.

Climate: Management within the pilot should be receptive to change and willing to solicit the ideas of the work force. Otherwise, the participative methodology will not take hold.

Business Impact: The group should provide services or outputs that are recognized as important to the business of the company. For example, the pilot project at Rocketdyne, an aerospace unit of Rockwell International, was made up of engineers involved in design and testing of the space shuttle's main engine. A second major company involved in the project, a major pharmaceutical company, chose to use a research department which conducts initial drug safety tests.

The methodology incorporates the need for an objective third party to coach the group along its way. This "facilitator" or "change agent" may be an outside consultant or a company employee with both experience in using the methodology and training in group processes.

The importance of providing this third party objectivity is readily evident in the first step of the methodology, the diagnosis phase, where employees must feel free to speak candidly about their working life without fear of recrimination from management. While the facilitator plays an important role in subsequent phases, the importance of employee and management roles begins to grow. In this way, the methodology gradually diminishes reliance on outside experts and leaves the groups equipped to repeat the productivity improvement process as necessary.

The Six Phases

Diagnosis Phase

The purpose of the first phase is to clarify and reach agreement among members of the pilot group on the major services and outputs they provide; to evaluate several major opportunities for productivity improvement; and to identify and resolve obstacles to the improvement effort, such as low morale or insufficient resources.

In most cases, all members of the pilot group respond to a written survey. Next, a "diagonal slice" is taken of people representing various types of jobs and levels of responsibility in the pilot group. Those people are interviewed individually by someone outside the group. Typically, about 20 percent of the actual pilot group is interviewed. In addition, those who use the pilot's outputs or services—their "customers" within the company—may be polled as to *their* assessment and expectations of the pilot group's work.

Objectives Phase

The group develops objectives for each of its services or outputs. These objectives reflect both group members' and their customers' expectations in terms of quality and timeliness in service delivery. By carefully setting objectives, the group can also align its own work with corporate direction.

Measurement Phase

With objectives clearly stated, the group next develops indicators of the effectiveness of its services and

outputs. The aim is to create a family of measures that can track quality and timeliness of service delivery as well as use of resources. To do so, a task force or similar group of employees use brainstorming to develop ways to assess effectiveness. Managers next assign weights to the various indicators according to their importance, ensuring that the measurement system reflects priorities in service. The weights should add up to 100 percent, but the weights assigned to individual measures can vary greatly. Following is an example of a weighted family of measures in which results of a user survey are clearly far more important than software progams developed:

Measure	Weight
a. Software programs developed per quarter Total number of hours required to develop programs	.05
b. Results of user utilization survey Potential results	.35
c. Number of programs delivered on time and budget Total number of programs developed	.25
d. Total number of errors per program developed Total cost to correct these errors	.25
e. Total time spent on program development Total time available	.10

Service (Re)Design Phase

As they develop and analyze measurement data, groups typically see opportunities for significant productivity improvement. In this step, employees are encouraged to make the changes necessary to realize those gains.

In some cases, this requires formal design of a heretofore implicit, informal service structure. In others, it requires completely redesigning working procedures. To pinpoint "leverage points," or areas where a change would have the greatest impact on productivity, groups of employees produce graphic maps of their service steps. Common bottlenecks—such as multiple approval requirements on capital allocation requests or backlogs at the typist—are flagged for attention.

Team Development Phase

Changes in the way services are produced and/or delivered typically require changes in the way employees and managers work together. In the team development phase, pilot members clarify their roles and their interactions with other work groups, and develop procedures for backing up one another when needed. For example, a pilot group at Official Airline Guides established a cross-training program for themselves so they could help each other out when workloads in different parts of the department became unbalanced.

Technology Parameters Phase

Not until the final step of this methodology for white-collar productivity improvement do workers explore potential applications of technology, such as computer systems or office environmental designs.

By this time, typically seven to nine months after the scouting mission, the group has defined opportunities for improvement, learned what its customers expect of its services, set up procedures to measure progress toward its improvement objectives, and created or realigned services to help meet those objectives. Along the way, needs for new equipment or improved office design to spur productivity improvement typically surface. At this point, the group has the information it needs to describe the *best* new computer system, office layout, or other technological change to bolster its productivity improvement progress.

This does not necessarily entail massive investments in new systems. Often, altering the way existing systems are used is sufficient. For instance, a personnel group in McDonnell Douglas gave other departments access to the personnel computer files for routine updates. The personnel department maintains the confidentiality of the files, which are now updated more expeditiously, and former file keepers have been reassigned to more productive work. A pilot group at Rocketdyne (as explained in the case study on page 7) simply established some rules about access to personal computers with significant results: extra terminals did not need to be purchased.

If the group decides to invest in new technology, a task force is assembled to work with company experts to ensure that the new technology meshes with the newly improved service structure.

Results

The Rocketdyne case study included in this publication traces the progress of the pilot group in that company as it used the described methodology.

Other examples of changes wrought in pilot groups include the following:

1. Specialized scientists in a research group that evaluates new drug compounds for safety learned to coordinate their activities better. As a result, they reduced the time needed for a standard safety study by 26 percent, enhancing the firm's competitive position.

2. The subscription service department at Official Airline Guides redefined its role as being that of customer service as opposed to mere transaction processing. By computerizing routine tasks, it was able to

find time to work more closely with subscribers to understand their needs and to improve first-time delivery of publications sent. As a result, they achieved a 35 percent reduction in double-filling of orders. In addition, through cross-training, they saved thousands of dollars in the cost of temporary help that otherwise would have been needed during peak workloads.

3. The personnel group at McDonnell Douglas has documented $1 million in annual savings from giving other departments direct access to personnel files for routine updates.

4. An operational auditing group reexamined its mission and radically altered its direction. It shifted its focus away from catching exceptions to business procedures toward finding opportunities to guide and advise those making the exceptions. In short, the auditors became counselors, not police.

Observations and Conclusions

In addition to spurring productivity at the pilot group level, the testing of the methodology through pilot projects also contributed significantly to general knowledge of white-collar productivity and improvement practices.

The two-year test of its methodology supported many initial assumptions about white-collar productivity and improvement efforts. These findings fall under eight general observations:

1. When seeking white-collar productivity improvement, too much attention is typically paid to the specific technique to be employed. Issues such as management style, a service orientation, and strategic direction are, in fact, more important.

Many managers are able to monitor and control, but this will limit their ability to brainstorm productivity ideas with employees. Furthermore, white-collar departments typically promote their best professionals on the basis of advanced degrees and professional distinction. However, this expertise in a discipline or science does not ensure operational insight. Upgrading the managerial skills of a professional can be well worthwhile.

An orientation toward change is important because few operations are so well-honed that a fresh look at the business is unwarranted. However, it is important that efforts to change be sincere, not simply a response to political pressures.

Setting strategic direction can be critical. Few white-collar departments take the lead in shaping their own destiny, and they often find it difficult to discover, in the larger organization's direction, implications for their own plans. Yet a vision of what the department could be can serve as a major motivator for employees to change the way they work.

2. Attention to "operational" issues will enable productivity improvement to take place. In addition to professional expertise, white-collar functions have resources at their disposal, people to be managed, obligations to clientele, and an opportunity to further the strategic direction of the entire organization. Approaching white-collar functions as *businesses* with both operational constraints and opportunities can pay off.

3. White-collar professionals require additional training in order to deliver their services effectively. They are not just repositories of expert wisdom. They deliver products and services, but often are not prepared for this role and require further training.

4. Administrative systems within an organization offer a major opportunity for productivity improvement. Organization or division-wide administrative systems and procedures could well bear a closer look. Particularly in contract organizations, such as aerospace and defense firms, the ability to acquire resources quickly, perhaps through revamped capital allocation systems, can mean greater profit.

5. Measurement of white-collar work is both possible and desirable. It is also most apt to be successful if approached in certain ways:

   a. Measurement does not drive the productivity improvement effort. Measurement is but one of many tools used to address effectiveness.
   b. Measures are associated with major components of the business, not with individual output. Measurement of individuals can be so threatening it defeats its own purpose.
   c. Measures are developed in light of set objectives and goals.
   d. The people actually engaged in the work develop the measures, collect and interpret the data, and determine needed changes.

6. Technology purchases, such as computer-mediated systems or new office environmental designs, are best justified when linked to critical junctures or features of white-collar services. Merely automating what was previously done manually is pointless if the work done manually is awkward and bureaucratic to begin with. Better to examine the work, establish goals for its future, and then examine which technological investments are most appropriate.

7. Self-reliance is a key to ongoing productivity improvement. Improvement should not be dependent on the presence of a consultant. All too often productivity improvement is a "project" undertaken as a one-shot effort. Better to become a "process" that becomes a way of life.

8. White-collar productivity improvement is dependent on several critical success factors. These are:

- A climate supportive of change, innovation, and

risk-taking.

- A vision for the future of the function that is shared among all employees.
- Emphasis on service issues and opportunities.
- A flexible methodology, one the function can adapt to its own circumstances and business.
- Technology directly linked to productivity leverage points.
- Involvement and "buy-in" by most employees at all levels of the function.

III. Case Studies

Following are case studies of two organizations using two different approaches for increasing white-collar productivity. The first, involving the Rocketdyne company, was part of the pilot project to test the APC methodology. The second, that of the Equal Employment Opportunity Commission, details the efforts of an organization to develop its own approach to increasing white-collar productivity.

A. Increased Employee Involvement Is Key to Rocketdyne Productivity

"If you want to design rocket engines, this is the place to be," said Bob Nordlund, nodding toward the sea of desks where Rocketdyne engineers push the limits of space travel.

These are the unsung heroes of America's space program, the nameless thousands of specialists—Nordlund's expertise is aerothermodynamics—it takes to conceive, design, test, and construct the complex engines that power NASA's space shuttles.

Nordlund's Design Technology division runs "dynamic analyses" of designs for the space shuttle's main engine (SSME, familiarly) against the different "environments"—defined by the size of the payload, among other things—of each shuttle mission.

They work in obscurity in a huge second-floor expanse in one of a collection of low-slung buildings dating to 1955, when Rocketdyne began designing and building rockets, including the Redstone engine that powered America's first manned spaceflight.

But it was not fame these graduate- and PhD-degree engineers sought. It was new desks.

"It's ridiculous," Nordlund explained. "Here we are. A staff of highly trained, highly paid professionals doing some of the most challenging engineering work anywhere. And when I pull up to my desk, I get splinters in my pants."

In a 1984 survey, employees had cited a collection of workplace environment problems as the greatest barrier to improving their own productivity.

Their workplace was noisy. Workers lacked privacy. Desks and chairs—heavily scarred oak and pine—were squeezed into boxes formed by chest-high partitions. Traffic aisles through this bullpen frequently were clogged by meetings—there were no conference rooms available. Makeshift shelves were crammed with books and computer printouts. More stacks of paper were piled under some workers' chairs.

The environmental issue was one of several that was finally addressed when Nordlund and 79 other Rocketdyne employees became one of 56 pilot groups in the American Productivity Center's two-year white-collar productivity improvement project.

Rocketdyne

Rocketdyne is a major division in the aerospace segment of Rockwell International, a diversified $9 billion company. Rocketdyne is typical of many American companies where managerial, professional, and clerical staff comprise the bulk of the work force and command the greatest share of the payroll. Such white-collar workers make up roughly 70 percent of Rocketdyne's total work force of about 6,800. Eighty percent of the people in the Rocketdyne pilot group were graduate-degree engineers.

The Design Technology division was chosen as the pilot group because Rocketdyne management thought it provided the best "fit" between the project's participative philosophy and methodology and the management style already practiced in Design Tech. The pilot group included two groups from aerothermodynamics and performance analysis and four groups from dynamics analysis. Together they comprise a support group for the engineering department performing analytical checks on all engine parts as required.

Wilbur Wilhelm, Rocketdyne productivity director, explained that John Haworth, manager of the space shuttle main engine structural dynamics, was selected as pilot manager "because he had demonstrated success running employee problem-solving groups and encouraging participative management."

The Project

The white-collar productivity improvement project started with a series of introductory meetings designed to enlist employees' commitment to the project by demonstrating corporate support and addressing employees' concerns. Dale Buhr, Rockwell's corporate manager of productivity systems and planning, explained how the project fit into overall corporate productivity improvement efforts. Previously, efforts had focused chiefly on manufacturing, where the company invested billions in new factories, robotics, and computers, reducing the average age of its machinery to 10.7 years in 1985 from 12.4 years in 1979. The white-collar project would intensify Rockwell's focus on what corporate vice president Edward A. Loeser calls, "the people side of the equation."

The introductory sessions also covered the project's philosophy that human resources are any firm's greatest asset and its best leverage for ongoing productivity gains. The meeting helped allay employees' concerns that this would be just another time and motion study. Such studies had been tried at Rocketdyne; Nordlund could recall a time when Design Tech engineers were asked to keep track of their time down to three-minute increments. Tony Zecca, the American Productivity Center research associate assigned to the Rocketdyne pilot group, stressed the fact that the white-collar project would seek improved group effectiveness rather than individual efficiency.

Diagnosis Phase

Zecca, an engineer on loan from Armco, led the pilot group through the diagnosis phase of the white-collar methodology, in which the pilot group identifies its purpose, problems, and opportunities for improvement. A survey of the entire pilot group was conducted. People from all grades and functions within the group were interviewed as well as 14 people from outside Design Tech who relied on pilot group members for information.

The group identified the following as their major services and customers.

Services: Highly technical, state-of-the-art analyses in structural dynamics, rotordynamics, aerothermodynamics, fluid dynamics, heat transfer, and dynamic simulation.

Customers: Some groups within the pilot group itself, other engineering groups within Rocketdyne, and NASA's Marshall Space Flight Center.

The diagnosis phase also helped the group identify three problem areas.

1. Communications. "One of our biggest problems has been lack of feedback on reports or analyses," explained Scott Vogt, who became co-chairman of an employee involvement team that would look into ways to improve communication. Part of the reason lies within the nature of engineering. "Engineers tend not to be 'people people,' " Vogt said, echoing comments from throughout Design Tech ranks. "They tend to like isolated work on difficult problems. They value the technical aspects over the teamwork aspects. And they tend to get promoted into management positions on the basis of that technical skill, not their managerial abilities."

2. Work Environment. The workplace at Rocketdyne was noisy, crowded, and distracting. The engineers in Design Tech cited this as the biggest barrier to improving their own productivity.

3. Computer Usage. One element of the computer problem was related to the work environment problem. The engineers in Design Tech shared eight computer terminals, and finding an open one could require a good bit of walking.

In addition, Design Tech staff felt that not all employees had sufficient training in the various types of computers and personal computers available to them.

They also complained of "computer hogs" who walked away from PCs or other terminals without signing off so others could use the equipment. An "improvement team" was organized to look into each of these three problem areas. In addition, a

steering committee was assigned the task of developing a statement of Design Tech's purpose and a list of objectives that would help the pilot group achieve that purpose.

Objectives Phase

The steering committee, with input from department employees, developed a statement of purpose and general objectives to guide the improvement teams' efforts—and Design Tech's future:

Design Technology Purpose

1. The purpose of the Design Technology section is to participate interactively in the design process of Rocketdyne programs. This participation will be accomplished by performing, documenting, and reporting the results of sufficient analysis, data evaluation, and testing necessary to maximize the performance and integrity of expensive product-line hardware with a minimum weight penalty.

2. Support of Rocketdyne programs will be accomplished to guarantee conformance to contractual criteria, Rocketdyne procedures, and internal policies.

3. Design Technology will obtain and/or develop the analytical and data evaluation techniques along with the testing capabilities required for performance of these analyses.

4. These functions will be performed with a goal of producing a quality product while reducing overall Rocketdyne project and hardware costs.

(In other words, the employees were saying, "We'll see that Rocketdyne designs good, light rocket engines. We'll do so according to the rules of the nation's manned space program and our company. We'll use the best tools we can to do our jobs well. And we'll keep costs low and quality high.")

To achieve that purpose, the group developed a list of objectives. Members of each of the six working units within the pilot group offered their views as to how they could contribute to this stated purpose. The steering committee consolidated all the ideas offered and sent the new list back to the "grassroots," as Haworth puts it, for review. The list of objectives is as follows:

Productivity Improvement Objectives

- To improve group effectiveness and efficiency through improved communication among the technical staff and between the technical staff and management.
- To maximize group effectiveness and efficiency through improved work environment for the technical staff.
- To effectively and efficiently use the proper computer systems and personal computers.

While these statements of purpose and objectives were being prepared, the three "improvement teams" were also at work analyzing the problems they were assigned. They developed the following recommendations.

Communication Improvement Team:

—Change performance review procedures to assure more frequent employee-management interaction and feedback.

—Provide more training and indoctrination for new hires

Work Environment Improvement Team:

—Minimize through traffic in work areas.

—Increase partition height to reduce noise.

—Reduce number of occupants in each cubicle.

Computer Usage Improvement Team:

—Create a central file for PC programs and PC help list.

—Define computer use rules.

—Increase user training and familiarization courses.

Work by these teams continued while the entire pilot group went through the next two phases of the methodology—measurement and service (re)design.

Measurement

The third phase of the white-collar methodology directs employees to create their own benchmarks. Using brainstorming techniques, a diagonal slice of the pilot group suggested quantitative methods of tracking the group's progress toward its objectives. For Design Tech, the toughest step of this phase was overcoming fears that these productivity measures might be used punitively.

Pilot manager John Haworth stressed that the goal was to set benchmarks of group effectiveness—not individual productivity. He promised that "if any of these measures are perceived by the group as being used punitively, they will be discontinued or modified to prevent such action." He added that the family of measures developed would be flexible, and that "we anticipate additions, deletions, and modifications during periodic reviews," set every three to six months.

The measures would be tracked by each unit in the pilot group, with data on many of them posted on a bulletin board outside Haworth's office so employees could see how they were doing. Some sample measures:

Objective:

To ensure that information and recommendations are communicated to users and to sufficiently document work for users and other analysts.

Measures:

- User satisfaction survey.
- Analyst satisfaction survey.
- Number of tasks versus number of tasks sufficiently documented (let the user help define "sufficiently").

Objective:
To accurately estimate rocket component and system environments using the best available sources.
Measures:
- Percent of environments verified by measured laboratory simulation data versus total environments estimated.
- Percent of environments verified by operational measurement versus total environments estimated.

Objective:
To participate at early stages of the design process and to provide quality product designs at minimum cost.
Measures:
- User and analyst surveys.
- Percent of total drawings and drawing changes that go through each functional area.
- Participation records from design reviews.

Service (Re)Design

During the next phase, the workers asked themselves, "With the information we now have as to user expectations and benchmarks of effectiveness, can we improve the way we provide our services?"

For the Design Technology department at Rocketdyne, no major restructuring was considered necessary. The "user's survey" proved generally favorable. Instead, Haworth and pilot steering committee members set about smoothing the bumps in otherwise adequate processes.

First, they literally mapped each of their services, creating flow charts that indicated both the major analytical steps of "environment determination," for example, and the points where other work units or resources must be brought in or consulted during the analysis. These illustrations graphically showed where scarce computer resources or lack of cooperation from another unit could thwart progress and put employees behind schedule. In all, more than 20 such bottlenecks were discovered and investigated through service mapping.

Results

Creation of the flow charts led to a simple solution to one of the problems the Communication Improvement Team was examining. "They [the charts] have become very good tools for training new hires," Haworth said.

In fact, the flow charts became part of an effort by the Communication Improvement Team to see that new employees are thoroughly oriented. The statement of purpose and the service objectives developed by the pilot group were similarly useful as standard introductory material.

Another accomplishment of the Communication Improvement Team was a 50 percent increase in feedback on internal letters (formal documents used for requesting funds, among other things). They attained this through the simple act of attaching a return-to-sender comment sheet to outgoing letters.

The team is continuing to pursue an improved performance review system, aware that this is a fundamental and therefore long-term change. But success on simpler problems helped employees remain interested in staying with the project for the long haul.

The Work Environment Improvement Team consulted on the reconfiguration of the work area and in the process established a good working relationship with Rocketdyne's facilities planning organization. While a massive redecoration is a long-term change, several beneficial alterations were made quickly. Some aisles in the work space were closed off, reducing distracting traffic. The team obtained more work space so that crowding in cubicles was reduced from four people per cubicle to two.

The team also completed an informal external survey to help establish norms for space, environment, and amenities. In addition, they are conducting a search of current literature in order to create an information base on ergonomics and office environment.

The Computer Usage Improvement Team tackled the problem of inadequate training for the variety of computers available. The solution? Lunch-hour classes taught by volunteers from Design Tech on selected topics based on a survey of all Design Tech employees. "Graduates" receive computer-generated "certificates of completion" entitling them to "all rights and privileges to use" the PCs.

"Computer hogs" also were targeted for attack. The solution to the problem of high demand for scarce resources proved disarmingly easy: a physical reminder to people that others needed access to the terminals. It took the shape of computer-drawn clocks, overlaid with movable hands. The result is much like placards placed in shop windows to show when the proprietor will be back. The clocks now hang beside every PC or terminal in the Design Tech section.

"More important than the time clocks was the policy we set, though," comments Bob Tarn, who chaired the Computer Usage Improvement Team. A time limit of 10 minutes was imposed on idle terminals, so that a person could reserve a terminal for a trip to the rest room, for example. If he didn't return within 10 minutes, anyone else who wanted to use the terminal could log him off.

A followup survey on the effectiveness of the time clocks is planned, but the consensus indicates a simple reminder of what amounts to workplace etiquette has significantly opened access to the terminals and PCs.

Status Report

The formal white-collar productivity improvement project ended in late 1985, yet the process continues at Rocketdyne. Employee committees still meet regularly. The improvement teams have come to be seen as the place to go with complaints or suggestions, and as these come in, they are acted upon.

More significantly, increasing numbers of Rocketdyne employees have joined in the chase for productivity improvement ideas. Three additional engineering pilots and another department, Advanced Programs, launched similar processes in 1985.

Unlike the Design Technology division, however, these additional white-collar productivity improvement efforts were initiated by employees, rather than management.

In their diagnosis phase investigations, subsequent groups uncovered complaints similar to those of Design Technology employees. "What was interesting was that both managers and nonmanagers complained of the same things," says Leo E. Dean, secretary of the steering committee for one of the newer pilots, a 90-member group including employees charged with in-flight operations and continued development of the space shuttle main engines.

Like the Design Tech group, Dean's pilot also cited computer resources and communication as barriers to productivity. Volunteers formed committees to attack these problems, as well as problems affecting professional development and organizational structure. Members of the Design Tech involvement committees coached these and similar employee teams in the other pilot groups. Robert Goldman, a representative of Rocketdyne's Human Resources Development department, helps coordinate activities among the various engineering pilots.

Goldman also will help get the process rolling in the Advanced Programs department, where still more engineers, as well as mathematicians, physicists, other scientists, and finance and marketing experts seek new contracts and develop new products for Rocketdyne. The department also handles all annual operating and strategic planning for Rocketdyne.

Don Warren, manager of operations in Advanced Programs, already has launched seven pilot groups encompassing about 420 of the department's 550 employees. Warren sees the process as a way to better integrate activities among the various disciplines of the Advanced Programs department by getting them to think of one another as partners in new business development and administration. Each of the Advanced Programs pilots has set productivity improvement goals ranging from 3 to 7 percent, he adds.

"I know the quality of work life and employee participation, or communication, will be major issues, as they have been in the engineering pilots," Warren says. "But it's aspects of day-to-day work we'll try to modify. It's the simple things that often can make big differences—some of them so simple, employees say 'I don't even want to bother the boss with it.' "

Self-Sufficiency

Through the white-collar project, Rocketdyne employees have learned that suggesting a better way isn't a bother, it is a responsibility shared by all to meet customers' needs most effectively. They have found that they, themselves, can define, measure, and improve their effectiveness as a work group. They have learned how to use techniques, such as brainstorming, to marshal widespread involvement in problem-solving. And they have adopted a step-by-step process they can use over and over again to make the corporate cultural changes they believe are necessary to spark innovation and fuel continued productivity gains.

"The white-collar methodology is a much more powerful vehicle for changing an organization than quality circles or other types of employee involvement," comments Goldman, the human resource development employee who has become coach and coordinator of Rocketdyne pilot activities.

"The white-collar process takes a broader scope. It involves more people. It addresses far more of the nitty, gritty issues—such as reward systems and organizational structures—than circles typically are allowed to get into. And, thirdly, it's a far more sophisticated methodology. The early phases of the methodology—diagnosis, assessing needs, writing a mission statement and setting goals tied to the groups' services—provide a better groundwork for lasting change," Goldman explains.

One trouble with the process, Goldman continues, is the time it takes both to complete the steps and to begin to see results of employees' efforts. Impatience for change is particularly evident among Rocketdyne's younger employees, though pressure for quick results also is embedded in management's traditional, short-term focus, he says.

The white-collar project was just one of several ongoing attempts to improve both productivity and quality at Rocketdyne. Currently, there are five kinds of productivity improvement efforts in progress at Rocketdyne: quality improvement, automation, training, motivation, and a catch-all, miscellaneous.

A Quality Enhancement Plan includes symposiums for suppliers to see how the division can help them provide better products on schedule, for example. An Incident Review Board and various material review

boards track root causes of quality problems. Rocketdyne has automated manufacturing planning and inspection and introduced bar-code technology in some areas, in its first steps toward an ultimate goal of a "paperless factory." Word processors and personal computers are used throughout the division, and most new hardware designs now are done on CAD (computer-aided design) systems. "Miscellaneous" productivity improvement efforts include health fairs and promotions to reduce accidents, illness, and medical costs.

Perhaps the most significant result of Rocketdyne's involvement in the white-collar project is the growing awareness among both managers and employees, young and old, that productivity improvement requires an ongoing effort.

"Awareness seems to be a real key in creating the kind of climate in which productivity improvement can be considered," according to a report on the project issued at a NASA productivity conference in September 1985.

"The very nature of the process, including the important role of heightened awareness, is one of long-term commitment. In this kind of environment, problems and impediments to efficiency are constantly being ferreted out. Solutions to these problems are constantly in work.

"At Rocketdyne," the report continues, "the idea that productivity improvement is an ongoing effort has given individuals the impetus to continue working on problems for which there are no short-term solutions."

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B. Equal Employment Opportunity Commission Adapts Manufacturing Quality Assurance Methods to a Government Agency

Can statistical quality control techniques, well known for their contribution to the Japanese industrial miracle, be used to ensure excellence in a Federal Government agency where the chief products are investigations and lawsuits?

To judge by the results already obtained from a quality push initiated in 1983 by the Equal Employment Opportunity Commission, the answer is yes.

The following represents one of many approaches being taken by organizations attempting to increase white-collar productivity.

Background: The 44 Percent Rule

The Equal Employment Opportunity Commission (EEOC) is part of the executive branch of the Federal Government. Its five commissioners are charged with enforcing statutes that outlaw discrimination in the workplace on the basis of race, color, sex, age, religion, and national origin. The commission's staff of approximately 3,000 civil servants, working out of headquarters, regional, and district offices, investigates and litigates charges of employment discrimination.

When Harriet Ehrlich became EEOC district director for Houston in 1979, one of many performance standards was a numerical definition of productivity—44 percent of all cases should be settled. "Who cared how well?" she says. That rule had been established to cope with a backlog of cases that had built up during the 1970s. And, in fact, the 44 percent rule worked—much of the backlog had been eliminated.

But, obviously, Ehrlich says, there were problems with this approach. First, a lot of cases were settled simply because the employer accused of discrimination found it easier to pay up than to resist. Second, legitimate cases were settled for less than full relief—a claimant might agree to accept $1,000 rather than a year's back pay, for example. And finally, because the emphasis on just settling cases led to sloppier investigative work, many important cases that could have been won were lost or settled out of court.

In 1983, the recently-appointed chairman of the EEOC, Clarence Thomas, reviewed various strategies presented by management to improve day-to-day operations and the agency's compliance and litigation practices. Some of the options offered him included traditional compliance review procedures, in which headquarters staff go into district offices and monitor quality and settlement rates. Such procedures involve no method of defining quality in relation to EEOC work, and Thomas felt they would foment field-versus-headquarters dynamics. Thomas instead chose to institute a quality assurance process that gave full responsibility for defining and improving quality practices to the field offices.

EEOC Overview

Polly Mead, director of organizational performance services, describes the route chosen by Thomas for the EEOC as "total quality management." It entails careful statistical measurement of the work involved in case processing and litigation, and a "systems" approach to the EEOC's work, in which each office is

seen as a group of interdependent parts. At the same time, it emphasizes improving the leadership skills of managers in the agency. The program helps them develop skills to manage participatively, that is, to involve their employees actively in identifying and solving work problems.

The EEOC has 23 district offices around the country and 25 smaller area offices that handle local jurisdiction cases. The commission has two purposes in its efforts to remedy discrimination. First, it seeks to repair any "damage" done to the aggrieved party, typically through restoration of lost wages. And second, it attempts to put some sort of preventive measure in place that will lessen the possibility of future charges. This corrective action may include a posted notice by the employer and a promise not to discriminate again.

A typical office has four different units through which a citizen's charge of employment discrimination may pass.

At the Intake unit a citizen makes a formal charge of employment discrimination by completing various documents followed by an interview with an Intake specialist. Once it's determined that the EEOC has jurisdiction over the case, the Intake specialist gathers the details—the who, what, where, when, and why of the alleged discriminatory act or acts—and assembles these into a formal charge.

If a case is relatively simple or ' prima facie," it will be handled by the Rapid Charge unit. Rapid Charge cases are those in which a resolution can be reached quickly—cases, for instance, in which several witnesses are willing to come forward and evidence of wrongdoing is readily available. These are usually cases in which only one person or a small group of people has been affected by the discrimination. The EEOC investigates the charge and determines whether discrimination is present.

More complicated cases requiring elaborate investigation and involving complex and multiple issues are referred to the Extended Charge processing unit.

As an example, cases involving patterns of discrimination that may lead to class action suits would go to Extended Charge processing. Marcos Salinas, quality assurance coordinator for the Houston district office, characterizes Extended Charge processing cases as ones which require an understanding of "the big picture."

Issues are subtle, Salinas points out. For example, you cannot prove discrimination merely by showing that the proportion of blacks in a firm's work force is smaller than the proportion of blacks in the local population. Other factors must be considered. Does the work force reflect the number of blacks in the relevant category—craftsmen, teachers, and so on—in the local labor market? Does the firm recruit nationally or locally? Does the company generally promote from within? If so, its management ranks are likely to be mostly male. What policies and practices act as barriers to hiring? All are issues which may have a bearing on the case.

Together, those who work in Intake, Rapid Charge, and Extended Charge are known as compliance staff. If discrimination is found and compliance staff cannot achieve a conciliation acceptable to both employer and employee, the case is forwarded to the Legal unit staffed by attorneys who ask the EEOC commissioners to authorize litigation.

Product Quality

Each unit in an EEOC office produces products—formal charges, interview notes, affidavits, investigative memoranda, memos proposing litigation, and the like—that are used by the unit next in sequence. As a case moves from Intake toward dismissal or litigation, the products and their quality standards become more complex, as does the work itself.

For example, in laying out the formal charge of discrimination, the Intake specialist must produce a narrative that has "chronological flow and *no* internal contradictions," to quote from the list of quality characteristics assembled by the Baltimore district office. Essentially, Intake specialists must get the story straight. It is the job of the investigative staff to assess the validity of evidence. The investigative memorandum, written by a compliance specialist, addresses the issue of contradictory pieces of evidence and explains why some are given more credence than others.

Those offices using the quality assurance approach have adapted statistical quality assurance methods to define exactly what standards of accuracy and timeliness apply to each product, to identify defective products, and to pinpoint the typical problem areas. Data are collected regularly and systematically and are charted or graphed to display progress over time.

"Instead of returning defective products for rework, employees can discover what prevents them from doing a good job the first time," says Polly Mead, who is responsible for enhancing statistical quality control and employee participation in the process. "When supervisors and staff spend less time on inspection and rework, they have more time available for more productive matters. Quality and productivity can rise together—you don't have to sacrifice one for the other," she says.

But statistical quality control can also create one more reporting system. Lest it be seen as just another layer of burdensome paperwork, the EEOC quality assurance approach involves the various office units in defining their own standards of quality.

In each office, a management quality circle, which includes the regional attorney, the district director, and all supervisors and managers, defines the pro-

ducts of each unit and sets quality standards for them. Members of the management quality circle are given problem-analysis and team-building training to help identify and solve problems more effectively as a group. To be successful, the program must strike a balance between statistical quality control and team development.

Getting Together

Historically, the EEOC's lawyers have maintained distance from the rest of the staff. At one time, the agency even had two separate reporting tracks for compliance and legal staffs.

Under the old system, a district office would investigate a case and then forward all the documentation to one of four litigation centers, where attorneys would decide whether to sue based on the information in the paperwork sent them. The attorneys often accused compliance staff of investigating charges sloppily and not compiling proper evidence. Relations between the compliance staff and the legal staff were cool. There were instances in which major cases had to be reinvestigated before they could be brought to court.

Even when district offices began to be staffed by their own attorneys the two groups rarely worked closely together. John Seal, the EEOC's management director, says that in some EEOC districts the lawyers were housed in separate office buildings, which hardly encouraged interaction with compliance staff.

The quality assurance process has brought these groups together. In some offices using the quality assurance process, for example, attorneys see a compliance staff member's investigative plan before the investigation actually begins, so they can advise whether it is thorough enough. Investigators, in turn, now have some say in whether a case will be litigated. In the Milwaukee district office, for instance, a recommendation about final disposition of a case is one quality characteristic required in the investigative memorandum.

This has markedly decreased the friction between legal and compliance staffers. "Now we're really a team," says Houston's district director Harriet Ehrlich. Her district office has even adopted a "buddy" system in which investigators and attorneys work together on cases, especially complicated ones. They have also developed an innovative "team" approach for deciding whether the evidence collected supports a finding of discrimination. This team review is an essential factor in Houston's success in expanding its litigation program.

Everyone interviewed for the case study cited increased cooperation between the lawyers and the investigators as one of the most important results of the quality assurance approach.

"Where It All Begins"

Having worked out the nuts and bolts of its quality improvement system during 1983, the EEOC in 1984 began setting up pilot programs in three district offices, Baltimore, Milwaukee, and Los Angeles. To date, ten additional districts—Houston, New Orleans, San Francisco, Atlanta, Denver, Chicago, Birmingham, Charlotte, St. Louis, and Miami—have implemented quality assurance projects.

The pilot programs first concentrated on Intake's products since "that's where it all begins," says Dorothy Mead, director of the Baltimore district office. Inaccurate or incomplete Intake products trigger a string of problems at subsequent stages.

The pilot project in Baltimore, for example, identified eight Intake products—documents such as interview notes and the formal charge form—and set quality standards for them. They tracked products for six weeks and discovered that 22.9 percent of the products were defective. These products related to 199 separate cases of alleged discrimination. Reviewing the documents for each case took 11 minutes, and rework took one hour per case. The flawed documents required 235 hours worth of inspection and rework—the equivalent of over five weeks redoing things that should have been done right the first time.

Only two months after quality standards were adopted in Baltimore, the percentage of faulty products fell to 7.5 percent.

In New Orleans, the quality assurance program has reduced paperwork. The managers of that office discovered that some 62 different products were being produced by Intake. Looking at them carefully for the first time, they concluded that many were redundant or outmoded. "People just kept using them because no one had told them to stop," says Pat Fields, director of the New Orleans district office, "and new forms were being added all the time." Five were eliminated on the spot, and another 20 were flagged for future study to see if they could be modified or dropped.

Success Breeds Success

Houston district director Ehrlich observes that the more thorough investigations prompted by the quality push have increased the number of cases in which discrimination is determined, which in turn has increased the number of lawsuits filed. In fiscal year 1984, the Houston district office took 10 cases to court. When fiscal year 1985 ended on September 30, 1985, the office had 52 lawsuits either filed or pending final approval by the commission in Washington.

Reminded that many people in this country would argue that we need less litigation, not more, Ehrlich responds that eventually there should be fewer law-

suits as companies learn either to settle out of court or, preferably, to stop discriminating in the first place.

During FY 1986, Houston was able to decrease the number of charges of discrimination in its system by 599 charges or 17.8 percent. Although the number of inquiries remained relatively the same as in previous years, the drop in numbers can be attributed to better screening, directly attributable to quality assurance. When charges are screened more carefully, frivolous or non-jurisdictional charges do not enter the system, thereby saving the government and the taxpayer the cost of unnecessary investigation time. The 17.8 percent decrease represents a one-year workload for five investigators.

As a result of its quality assurance efforts, in 1985 and again in 1986 the Houston office received the annual productivity award of the Federal Executive Board of the Houston-Galveston area. The Federal Executive Board is an institution supervised by the Federal Office of Personnel Management and consisting of the directors of Federal agencies with offices in a specific geographical area.

Local-Level Projects

Nationwide, about 45 percent of all charges of employment discrimination are handled by State and local agencies, under agreements with the EEOC. By working closely with these State and local agencies charged with enforcing anti-discrimination statutes, the EEOC began to spread the quality assurance efforts.

In the New Jersey Division on Civil Rights, for example, the quality assurance process led to streamlined procedures. Managers in the New Jersey agency discovered redundant, unnecessary, and confusing questions asked during the initial interviews. They reduced the number of interview questions from 74 to 17, and dramatically cut the amount of time citizens and staff spent gathering the details of a complaint.

The New Jersey agency also developed a half-page welcoming letter that is given to people as they enter the office. It describes briefly the specific areas of discrimination over which the office has jurisdiction, and gives information on the procedures and time involved in making a charge. This reduces the time Intake staff spends explaining routine information, and it also alerts the citizen to whether he or she is in the right office.

Pilot projects at the State level were so successful that some of the agencies involved are trying to adapt the technique to related functions of State government.

The Civil Rights Division of the Oregon Bureau of Labor and Industries, for instance, plans to extend quality assurance techniques to the processing of other types of discrimination cases, such as housing discrimination.

Commitment

Dorothy Mead, the Baltimore district director, praises the simplicity of the quality assurance program, "It works *within* the system as it is. It doesn't cost anything; it doesn't require new directions or new compliance procedures."

What quality assurance does require is commitment. As Betty Rasmussen, a private consultant documenting the quality assurance program, points out, it's "a very labor intensive process" because of the training people must receive and because of the data gathering it entails. "In contrast to many Federal improvement strategies, this program doesn't simply impose a new set of regulations, quotas, or requirements on the agency. Instead, it provides staff with the skills, guidance, and technical support to enable them to improve their *own* work," Rasmussen says.

With the success of the pilot program has come interest from other district offices. To start the process in a new district, Polly Mead and the Washington, D.C.-based quality assurance staff present a two-day orientation session for all the office's managers and supervisors on the quality assurance approach.

The session involves an introduction to quality concepts incorporated in the EEOC program. Participants are invited to discuss the situation in their own offices, focusing on their strengths, quality of the work products, the work climate, and needed improvements. Through the orientation, Mead says, "We share with participants the chairman's vision of EEOC as a high-quality agency. We help managers see the crucial role *they* can play in applying new ideas about the management of excellence to EEOC."

The orientation also involves a lot of what Mead calls "trust-building," including attempts to bridge gaps that may exist between members of the office management team, especially between lawyers and compliance staff.

If an office's managers conclude that they are ready to start on the quality assurance process, they then receive training in leadership and team-building skills. Additional training, in such subjects as statistical measurement, is provided as needed at later dates.

Commitment is also crucial because the quality assurance process can't work in half measures. Since the process focuses on the nature of the work, Mead says, everyone who does the work has to take part in the process. If commitment isn't forthcoming, the process is postponed. Pilot programs in two district offices were put on hold last year because changes in management made it impossible to sustain commitment to quality assurance.

Union Participation

Nonmanagement employees of EEOC are represented by the American Federation of Government Employees. Mead is currently working with union leaders to develop full employee participation in problem-solving teams in each office.

Some of the early pilot projects tested ways to involve nonmanagerial workers in the establishment of quality standards for office work. Employee participation on this limited scale was highly successful, and, with union support, Mead hopes to build this into all the quality assurance projects.

The union contract negotiated last year contains a quality-of work-life clause, and Mead feels that this is an excellent opportunity to work closely with the union on a common goal: bringing quality to all aspects of the EEOC.

No Gain Without Pain

In late July 1985, the EEOC held a meeting of the people involved in the pilot projects to evaluate the quality assurance program. It became clear that the program is no longer regarded as a pilot program; it is hoped that by 1988 quality assurance will be a way of life in all EEOC offices.

But there are difficulties. Mead cites two in particular. First, given the time needed for orientation and training, and time consumed in identifying products and their quality criteria, it takes quite a while—in some cases over a year—to install the process in a district office. Mead fears a loss of momentum, as it will take years to develop quality assurance practices in all the commission's 48 offices. Second, quality data are still not being collected routinely and easily in the offices using quality assurance techniques. It's not yet second nature.

Mead believes a certain amount of centralizing might be the answer to these problems. At the July meeting, she proposed to offer each local office a packaged list of products and quality characteristics for each unit, which the local office could tailor to its own taste. A similarly standardized data collection package could also be offered. But both ideas met with resistance.

For now, the district offices feel strongly that they are better off reinventing the wheel, if necessary, if it means that each office takes ownership over the quality assurance process. "They think it's worth the pain," Mead says.

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IV. Directory of Resources

A. Annotated Bibliography

Following is an annotated bibliography of readings on white-collar productivity improvement recommended by the American Productivity Center.

Dave and Pat Ackley. "Can MIS Lead the Push for Productivity?" *Computerworld*, March 11, 1985, pp. 35-40. The article answers, "No," but its main point is to call for coordination of industrial engineering, organizational development, and MIS into integrated productivity improvement efforts.

Ackoff, Russell L. *Creating the Corporate Future*. New York: Wiley-Interscience, 1981. Ackoff provides a theoretical and conceptual basis for participative management and the methods of interactive planning. This book provides concrete guidance for systems thinking and a blueprint for the management styles needed today.

Barnes, Kate. "Justifying OA the ROI Way." *Today's Office*, February 1984, pp. 71-74. The author examines two initial methods for documenting office automation's return on investment.

"BEA Associates, Inc.: Participative Approach Brings Growth, Satisfaction to Asset Managers." American Productivity Center *Case Study #24*, 1983. Describes organizational change, management style evolution, office automation, and environmental design aspects of a change process at a 45-employee New York firm.

Blanchard, Marjorie, and Tager, Mark. *Working Well*. New York: Simon and Schuster, 1985. Blanchard and Tager explore the health-productivity connection as a management responsibility. They stress the importance of managing in a way that keeps employees' stress—a health threatener—to a minimum. Their way is "PERKS": participation, environment, recognition, knowledge, style. They suggest ways managers can practice each to improve productivity as well as employee health and fitness. Part II tells how managers and employees can start health promotion programs in their workplaces.

Boehm, Barry W.; Penedo, Maria H.; Stuckle, E. Don; Williams, Robert D.; and Pyster, Arthur B. "A Software Development Environment for Improving Productivity." *Computer*, June 1984, pp. 10-44. A good article about TRW Inc.'s effort to improve productivity in its software production. Discusses various productivity improvement strategies, office environment, and automation techniques.

Bolte, Keith A. "Intel's War for White-Collar Productivity." *National Productivity Review*, Winter 1983-84, pp. 46-53. Solid advice and lessons learned are included in this review of one company's successful white-collar productivity improvement effort.

Borko, Harold. "Information and Knowledge Worker Productivity." *Information and Processing Management*, Vol. 19, No. 4, 1983, pp. 103-212. The author addresses key issues pertaining to the productive use of electronic systems in a knowledge worker environment: technology in support of goals (not mere activities), office restructuring, managerial practices, and job security.

Caruth, Donald L. *Guidelines for Organizing a Work Measurement Program*. Association for Systems Management, 1979. The key phases of work measurement are presented, along with problems that could be encountered in establishing and operating a work measurement program. A checklist is included for planning, implementing, and operating a work measurement program.

Cash, James I., Jr. and Konsynski, Benn R. "IS Redraws Competitive Boundaries." *Harvard Business Review*, March-April 1985, pp. 134-142. Explains a new concept in Information Systems, the IOS or Interorganizational Systems: what it is, how it can be used, and the potential benefits to both the company and the consumer. Though difficult reading, it's valuable because IOS is a new concept worthy of consideration.

Ceriello, Vincent R. "Computerizing the Personnel Department: Make or Buy?" *Personnel Journal*, September 1984, pp. 44-48. A realistic view of the pros and cons on building in-house or buying an automated human resources management system. Ceriello reviews both direct and indirect costs as well as the involvement of time necessary to implementation.

Clutterbuck, D. "The Whittling Away of Middle Management," *The Best of Business*, Spring 1983, pp. 44-48. Examines the paring down of middle management in American companies. The author points to four major causes of the change: swollen middle management ranks, general demand for higher productivity, new technology, and organizational change. In addition, the advantages of streamlining are discussed along with corrective actions some companies are taking.

Cole, Robert. "Target Information for Competitive Performance." *Harvard Business Review*, May-June 1985, pp. 100-109. A good article about the real value of information systems and differences between how the U.S. and Japan use information. A notable quote: "The U.S. measures only when social innovation threatens basic values . . . and then it is to prove that the proposal will not work." The article also stresses the point that information should be shared with workers and used for productivity improvement.

Collins, Richard O. "Team Approach to Facilities Planning Helps Cut Xerox's Downtime in Move." *Industrial Engineering*, March 1983, pp. 82-87. A good example of the use of employee involvement and concern for quality of work life in a high-tech, white-collar environment.

Comola, Jackie and Hordes, Mark. "White-Collar Productivity: An Executive Path to Organizational Leadership." American Productivity Center *Manager's Notebook*, Vol. 3, No. 3, October 1986. Describes seven roles an executive may play during a white-collar productivity improvement project: model, leader, advocate, translator, negotiator, coach, and planner.

"Computer People': Yes, they really are different." *Business Week*, February 20, 1984, pp. 66-67. The new breed of sophisticated managers and technicians creating and maintaining automated offices, factories, and other systems creates new challenges for human resource strategists. The editors find that personal challenge and growth, rather than big salaries or job titles, are key enticements to these knowledge workers—and key factors in their productivity.

Connell, John. "Is There an Office of the Future?" *Management Technology*, May 1983, pp. 22-31. A sound, basic probing of the "office of the future" concept that fired imaginations a decade ago. Actual progress in use of new office technology has been slowed by a too narrow, hardware-centered view, Connell says. Soaring white-collar costs are forcing companies to deal with both hardware and systems and to call for sophisticated responses.

Conner, Daryl R. "Introducing New Technology Humanely." *Training and Development Journal*, May 1985, pp. 33-36. The author argues that the MIS/DP staff must radically redefine their roles when it comes to introducing new information technology. Rather than focusing on the technical accuracy of the systems, data processing professionals should seek to facilitate technological change by helping end users relate to new technology and use it appropriately. Conner believes that human resources professionals can guide their MIS counterparts through this role change.

Cowan, W. M. "The Aging Work Force: Implications for Tomorrow's Office." *Administrative Management*, August 1982, pp. 22-23, 76-78. Cowan describes the implications of the aging work force on management practices. He summarizes the findings of a survey, "Employer Attitudes: Implications of an Aging Work Force," in terms of general issues, retirement policies and practices, and perceptions of an aging work force.

Dorin, Fred P. "Service Redesign: A Guide to Improving Service Flow." American Productivity Center *Manager's Notebook*, Vol. 2, No. 6, April 1986. Step-by-step how-to on: mapping service flow, choosing task groups, holding redesign meetings, developing action plans, getting management approval. Two illustrations: service map, action planning guide.

Dyer, William, and Dyer, Jeffrey H. "The M*A*S*H Generation: Implications for Future Organizational Values." *Organizational Dynamics*, Summer 1984, pp. 66-79. Dyer and Dyer surveyed over 1,000 college students at eight universities around the country to try to discover what kind of organizations they would create if they had the power to put their preference into effect. They elicited responses on desirable organizational values and processes, fears about organizations, leadership preferences, colleague preferences, and subordinate preferences. They discovered that college students of today are quite idealistic and oriented toward traditional values.

Feldman, Laurence P. and Page, Robert L. "Principles Versus Practice in New Product Planning." *Journal of Product Innovation Management*, Vol. 1, 1984, pp. 43-55. The authors review important factors in new product planning—a significant driver for corporate growth. Feldman and Page describe and examine the product planning practices at nine large companies in the electronics industry. The authors note shortcomings and suggest improvements through efforts to make the product planning process more uniform and systematic, to improve guidance provided by strategic planning, and to obtain greater input from marketing research.

Ferguson, Marilyn. *The Aquarian Conspiracy*. Los Angeles: J. P. Tarcher, Inc., 1980. This book offers a somewhat popularized description of major transformations that are underway in contemporary society and that make a shift from strong central leadership to decentralized employee participation inevitable for healthy businesses. The author, who is also publisher of "Brain-Mind Bulletin," a biweekly newsletter, integrates discoveries from behavioral and hard sciences as a basis for understanding the change. A useful idea generator.

Filley, Richard D. "IEs Make Good Use of People-Oriented Skills in Helping Their Organizations Provide Service Productivity." *Industrial Engineer*, January 1983, pp.36-39. Provides a look at the technology developments, new applications, and new directions of industrial engineering. The author includes six case studies, pointing to IEs' increased attention to the people element of productivity improvement in the service/support areas.

Finkelstein, Joseph and Newman, David. "The Third Industrial Revolution: A Special Challenge to Managers." *Organizational Dynamics*, Summer 1984, pp. 54-65. Finkelstein and Newman explore the six major high-technology change agents, the magnitude of the present changes, and their implications for management. The authors then outline three aspects of organizing for productivity: 1) Productivity improvement in production through self-optimization; 2) Productivity as an effective product developer, where development from concept to marketplace is a highly interactive process; and 3) Productivity as a corporate strategic process.

Frazelle, Ed and Smith, Clarence. "Productivity Improvement through Office-Space Planning." *National Productivity Review*, Summer 1985, pp. 265-274. The authors outline a systematic way to plan and design office space using participative methods. They address both the layout of the office at large and the design of individual work stations.

Fusfeld, Herbert I. and Langlois, Richard N. (editors). *Understanding R&D Productivity*. New York: Pergamon Press, 1982. A largely technical approach to evaluating R&D productivity with the goal of improving it. The 11 contributors attempt to deal with measurement, management's role, cyclical trends, and international comparisons.

Hammer, Michael. "The OA Mirage." *Datamation*, February 1984, pp. 36-46. Hammer takes a hard look at office automation and judges the dream for its effectiveness against current realities.

Hanlon, Martin D. "Reducing Hospital Costs through Employee Involvement Strategies." *National Productivity Review*, Winter 1985-86, pp. 22-31. One of the few articles written on employee involvement in hospitals. Hanlon provides good documentation of hospitals' efforts in the areas of employee involvement and participative management and describes factors critical to the success of such programs.

Heijn, Herman J. "Automate the Organization...or Organize the Automation?" American Productivity Center *Productivity Brief #14*, June 1982. Basic exploration of office automation issues. Illustrations: dimensions of office work, office in "internal company," choosing productivity improvement path, cost of filing, efficiency vs. effectiveness, department interdependencies.

Herzberg, Frederick. "Abstraction Revolution" series. *Industry Week*, January 10, 1983, pp. 67-70; January 24, 1983, pp. 34-38; February 7, 1983, pp. 38-39. This series of articles provides an interesting theory and analysis of businesses' move away from product emphasis to sales, marketing, and, finally, financial emphasis. It explores the resulting productivity burnout, alienation, and depression. Many will not agree with the theory, but it is food for thought.

Higgins, Brian K. and Dice, Christopher M. "Quantifying White-Collar Functions." *National Productivity Review*, Summer 1984, pp. 288-302. A conceptual outline of a relatively cumbersome system for measuring white-collar work nicely linked to organizational development objectives, but still relies on work being predictable and reasonably repetitive. The authors slight effects on product or service "users."

"Honeywell, Inc.: Office Systems Planning Promotes Efficiency in Field Operations." American Productivity Center *Case Study #26*, 1983. How Honeywell's corporate field administration developed and implemented an office automation and office design approach for 55 field offices.

Hudson, Jane D. "Office Technology: Turning Promises into Gains." *National Productivity Review*, Summer 1983, pp. 257-265. The author outlines three common pitfalls in office automation: misunderstanding the problem, misjudging the users, and ignoring the office social system. She advises those responsible for technology introduction to proceed carefully and thoughtfully.

Hutchinson, Frank and Gilbert, Greg. "Readying Your Company for Change." *Training and Development Journal*, May 1985, pp. 28-30. The authors urge careful assessment of the company's and its employees' readiness for change before introducing new technology. In addition, they briefly describe a "high-tech index," which can help measure how receptive to new technology people in different geographical locations may be.

Jackall, Robert. "Moral Mazes: Bureaucracy and Managerial Work." *Harvard Business Review*, September-October 1983, pp. 118-130. A realistic, incisive, but damning characterization of corporate bureaucracy. Interviews with management at all levels, internal documents, and seminars provide the material for the study. The norms of good management behavior presented include ignoring the long term, avoiding responsibility, concentration on appearances rather than reality, hypocrisy, and slavish acceptance of current dogma. In this interpretation, the current interest in productivity is just another fad. The implications for corporations are sobering.

Jacobs, Bruce A. "Designing Offices that Work." *Industry Week*, February 6, 1984, pp. 28-33. This overview of office design trends focuses on the relationship between the office environment and employee productivity. Psychological needs, cost effectiveness, and satisfaction factors are covered.

Jansen, Robert. "Work Redesign: A Results-Oriented Strategy That Works." *S.A.M. Advanced Management Journal*, Winter 1979, pp. 21-27. Work redesign is a productivity improvement strategy that encompasses structural changes in jobs, physical layout, work flow, and organization. This article describes each of these factors of work redesign with examples of applications in insurance, assembly-line operations, and clerical support. As a technique to increase worker participation, improve job satisfaction and increase productivity, work redesign is viable.

Jeffery, D. R. and Lawrence, M. J. "Managing Programming Productivity." *Journal of Systems and Software*, February 1985, pp. 49-58 This paper reviews a study on programming productivity carried out between 1976 and 1980. It examines the influence of technological changes as well as management factors. It suggests that programming productivity can be improved by establishing a structure that enables (1) effective reuse of a code, and (2) development of effective technical, management, and communication skills on the part of programming supervisors.

Kanter, Rosabeth Moss. "Frontiers for Strategic Human Resource Planning and Management." *Human Resource Management*, Spring/Summer 1983, pp. 9-12. Kanter proposes seven frontiers for strategic human resource management, including: increasing organizational flexibility, continuing innovation, managing cultural and strategy change, tactical planning, shift from "product" to "use" orientation, the broader human resource environment, and strategic planning for the HR function. She offers suggestions about how the HR field might start thinking about the seven frontiers and observes that piecemeal programs and one-

shot efforts that do not consider the entire context will not solve corporate problems of today or tomorrow.

Kanter, Rosabeth Moss, and Buck, John D. "Reorganizing Part of Honeywell: From Strategy to Structure." *Organizational Dynamics*, Winter 1985, pp. 5-25. Describes, in case study form, an effective participative process for adapting a department to its changing environment and to the needs of its internal customers.

Keen, G. W. "Computers and Managerial Choice." *Organizational Dynamics*, Autumn 1985, pp. 35-49. Presents an excellent case for senior management's active involvement in the strategic planning of an organization's technology acquisition and utilization. Provides the reader with an understanding of the complex issues related to information technology. The author makes an excellent case for not leaving the critical business decisions related to technology to "technocrats."

Kish, Joseph L., Jr. "Auditing Word Processing Productivity and Performance." *National Productivity Review*, Autumn 1982, pp. 427-436. A useful broadening beyond vendor-suggested analyses of effectiveness in the word processing function. Comprehensive individual and group monitoring formats are suggested. Missing still is recognition of the impact on productivity of the user-customer.

Lefton, Robert E. "Performance Appraisals: Why They Go Wrong and How to Do Them Right." *National Productivity Review*, Winter 1985-86, pp. 54-63. A realistic approach to the appraisal process identifies the salient issues that arise when organizations do not communicate with staff or consider employees input to determine their destiny. The author suggests that "the problems affecting the quality of appraisal can be largely overcome if appraisal becomes an ongoing year-round activity." He offers a five-step format for an appraisal interview in which supervisor and subordinate exchange opinions and devise a plan of action for carrying out what they agree upon.

Lehrer, Robert N., editor. *White-Collar Productivity*. New York: McGraw-Hill Book Company, 1983. A useful collection of varying approaches to white-collar productivity, including measurement, organizational management, analysis of functional activities and work, service, paperwork simplification, office technology, and human resources management. Includes a thorough description of the American Productivity Center approach to white-collar measurement.

Leth, Steven A. "White-Collar Productivity: A Survey of Current Efforts." American Productivity Center *Productivity Brief #19*, November 1982. Findings of a 1981 American Productivity Center/Steelcase, Inc., survey of U.S. firms' experiences in trimming white-collar costs.

Levinson, Eliot. "Implementation Path Analysis: A Method for Studying Implementation of Information Technology." *Office: Technology and People*, December 1985, pp. 287-304. The author describes a research method that breaks down a complex, long-term intervention into a commonly defined series of events and decisions. Similarities and differences of approach between interventions become clear even though they are very different in subject matter, as would often be the case in information technology. The key issues in the interventions are more organizational than technical.

Marcus, Alfred A. "Professional Autonomy as a Basis of Conflict in an Organization." *Human Resource Management*, Fall 1985, pp. 311-328. Using a hypothetical regulatory agency subjected to budget cuts, the author outlines several ways professional workers might respond to new financial constraints. The "conflict" in the title is between organizational and bureaucratic demands and professional ones. The author offers no solution to the problem but explains it cogently.

Marenghi, Catherine. "John Diebold talks about Information Management." *Computerworld*, December 6, 1982, pp. 2-28. A pioneer in information resource management reflects on the current state of corporate information policy. He analyzes the place of management information system (MIS managers, programmers, and end users). He concludes that the greatest productivity growth comes when applications most closely reflect and serve end users' needs. The public policy implications of increasing automation are also discussed. A thought-provoking discussion with an active thinker.

Mautz, Robert K.; Merten, Alan G.; and Severance, Dennis. *Senior Management Control of Computer-Based Information Systems*. New York: Financial Executives Research Foundation, 1983. This report on a survey of senior information managers in 12 companies with varying approaches to computer management demonstrates clearly the complex problems that can hound the best-intentioned computerization programs. It also reflects a limited organizational awareness that is often found in managers with data processing operations backgrounds.

Mayfield, Anne. "Get Over Those Hurdles — or Live in a Hodgepodge." *Management Technology*, February 1984, pp. 66-70. Mayfield skims some necessary first considerations in any move toward office automation.

McCabe, W. J. "Improving Quality and Cutting Costs in a Service Organization." *Quality Progress*, June 1985, pp. 85-89. Describing an IBM effort to control costs and maintain quality in such areas as purchasing, administration, and personnel, this article describes an interesting and useful form of "measurement": ongoing plotting of key issues and concerns that affect productivity and quality in a service environment.

McFarlan, F. Warren and McKenney, James L. "The Information Archipelago—Governing the New World." *Harvard Business Review*, July-August 1983, pp. 91-99. A useful summary of problems that arise in organizations out of the conflict between the interests of central information services (I.S.) departments and of users. The authors analyze advantages and limitations of I.S.-dominant and user-dominant environments, and suggest approaches to a balanced policy.

"Memorial Hospital: Change Management Aids Acceptance of Office Technology." American Productivity Center *Case Study #27*, 1983. How a Houston hospital's radiology department eased a transition to automated office systems using performance management techniques.

Mumford, Edid; Bancroft, Nancy; and Sontag, Bonnie. "Participative Design—Successes and Problems." *Systems Objectives, Solutions 3*, 1983, pp. 133-141. Participative design is defined as "the involvement of users in the design of systems with which they will eventually work." Mumford et al. discuss the benefits and opportunities of participative design and also the problems. The participative approach has been used effectively in many organizations, and a guide for its use is provided.

Munson, Vernell K. "Automation Defined: Teaching Old Companies New Tricks." *The Office*, February 1984, pp. 19-31. Automating an office is not just a matter of choosing technology. It involves analyzing the business to discover ways in which automation may in fact change it. Therefore, the author argues, top management must be involved in selecting office automation because they are the ones who understand the rest of the business.

Nollen, Stanley D. *New Work Schedules in Practice: Managing Time in a Changing Society*. New York: Van Nostrand Reinhold Company, 1982. Thorough explanations of such options as flexitime, job sharing, part-time employment, and compressed work weeks. The author provides many cases from the U.S. and abroad and addresses use of these options in both manufacturing and nonmanufacturing settings.

"Norwest Bank St. Paul: Employee Participation Teams Yield Improvement in Morale, Communication, and Productivity." American Productivity Center *Case Study #30*, 1983. Describes initial implementation phases of a broad participation process.

Oborne, David J. *Ergonomics at Work*. New York: John Wiley & Sons, Inc., 1982. This book looks at ways in which the working relationship between people and tools can be adapted to perform at its most efficient level. Includes a history of ergonomics and chapters on man-machine communication, design of work spaces, physical environments, safety, and other topics.

"Office Automation and the Workplace: Standards for the 80s." American Productivity Center *Productivity Brief #36*, May 1984. Describes Facilities Management Institute's method for judging effectiveness of computer expenditures; includes results of a study relating expenditures to management productivity.

Olson, Van. *White-Collar Waste*. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1983. A practical and thorough case-by-case explanation of short interval scheduling as a way to increase planning and control and, thereby, productivity.

Panko, Raymond R. "Office Work." *Office: Technology and People*, Vol. 2 (1984), pp. 205-237. A simple but rigorous introduction to the study of the office, including an excellent discussion of the misinterpretation that is often made of "white-collar productivity" statistics. Also includes a summary of studies of managers' use of their time and a discussion of the conflicts between office automation and data processing.

Panko, Raymond R. "Productivity Trends in Certain Office-Intensive Sectors of the U.S. Federal Government." *ACM Transactions on Office Information Systems*, October 1985, pp. 30-379. The author finally demolishes the idea of macrocalculation of white-collar productivity (GNP/office workers) and properly relates white-collar productivity to small, relatively homogeneous departments or work groups with their own specific outputs. He uses examples from federal government agencies and finds substantial recent productivity improvement there using Bureau of Labor Statistics data.

Paschke, Paul; Taylor, Lawrence A.; and Thor, Carl G. "Measuring the Productivity of a Hospital's Clinical Laboratory." *Journal of Medical Systems*, Vol. 8, No. 4 (1984), pp. 265-277. The American Productivity Center model is used to evaluate the productivity of the pathology laboratory of Memorial Hospital, Belleville, IL. One of the first serious attempts to measure the productivity of knowledge workers in a service organization.

Patterson, William. "Unease in the Electronic Office." *Industry Week*, April 14, 1986, pp. 51-59. Technical problems relating to computers' "connectivity" have plagued the so-called electronic office. But the author points out that office automation likewise raises a host of political problems. "Whatever kind of information system a company adopts—department or corporate-wide—it challenges the existing power structure. Information is the bloodstream of power. No information, no power," the author writes.

Pava, C. H. "Designing Managerial & Professional Work for High Performance: A Sociotechnical Approach." *National Productivity Review*, Spring 1983, pp. 126-135. This article seeks to describe a new mode for sociotechnical system design to fit the nonlinear and nonroutine character of much higher level knowledge work. A brief case study is included.

Pava, Calvin H. P. *Managing New Office Technology*. New York: Free Press, 1983. Pava's book is a breakthrough in introducing sociotechnical design to the office setting. Particularly novel is his treatment of nonroutine work—the domain of executives and professions. He presents the logic to first view office organizations from social and technical design perspectives and then to consider office automation and equipment.

Peterson, Robert O. "Moving Operations Out of the Cellar." *Datamation*, October 15, 1984, pp. 162-166. A timely article on MIS responsibilities emphasizes the role of computer operations—a neglected area in the recent literature.

"Petro-Canada: Effective Use of Office Automation Results from Integrated, Long-Range Planning." American Productivity Center *Case Study #32*, 1984. Details a strategy for investing in office automation and describes pilot projects in word processing that integrate word and data processing and electronic mail.

Porter, Michael E. and Millar, Victor E. "How Information Gives You Competitive Advantage." *Harvard Business Review*, July-August 1985, pp. 149-160. A good article on the application of information technology. By showing how corporations can use information technology to control costs and enhance product differentiation, it relates information to the bottom line.

Pucik, Vladimir. "White-Collar Human Resource Management: A Comparison of the U.S. and Japanese Automobile Industries." *Columbia Journal of World Business*, Fall 1984, pp. 87-94. An excellent comparative review of current conditions of white-collar employment in the American and Japanese auto industries. Issues addressed include a breakdown of white-collar labor force composition, age-sex profiles, the role of human resource and information resource functions, future trends, and compensation comparisons.

R&D Productivity. Los Angeles, CA: Hughes Aircraft Co., Second edition, 1978. Points concerning organizing for productivity and managerial productivity are applicable to any organization. Hughes' study team developed quantitative and qualitative indicators to measure performance of individuals and the organization. Both general and specific measures enable Hughes to track R&D productivity and evaluate improvement efforts. Also has profiles of productive workers and outstanding leaders, and an extensive bibliography.

Ruch, William A. "The Measurement of White-Collar Productivity." *National Productivity Review*, Autumn 1982, pp. 416-426. An excellent overview of the problems of productivity measurement in nonrepetitive "white-collar" departments. A list of useful guidelines is supplemented by three case examples that illustrate alternative applications.

Rubin, Howard A. and Von Kleeck, D. L. "Incentive Compensation for Information Systems Departments." American Federation of Information Processing Societies Conference Proceedings, Vol. 53 (1984). A useful technical article about the group measures (ultimately formulas) that could be installed in information systems departments. The article considers productivity (cost, quality, and timeliness). Each of the basic sub-departments (advanced technology, business applications, and systems development) is discussed. Communication and employee involvement aspects are ignored.

Russel, Robert A. "Repealing Parkinson's Law." American Productivity Center *Productivity Brief #26*, June 1983. Canadian futurist Russel explores information's new role as a valuable market commodity and implications for information management, education, and training.

Schlisinger, Leonard A. "The Normative Underpinnings of Human Resource Strategy." *Human Resource Management*, Spring/Summer 1983, pp. 83-85. Schlisinger summarizes the shifts in the business environment, work force demographics, attitudes, and values over the past 30 years. He describes the need for value considerations and proposes a framework for addressing values in the context of human resource strategy.

Schmitt, Roland W. "Successful Corporate R&D." *Harvard Business Review*, May-June 1985, pp. 124-128. A good analysis of the role of corporate R&D. The key issues are whether such research should be generic or applied, market driven or technology driven. The author points out that there is no clear answer, but the organization must be clear about what it expects to achieve with research in order to be successful with either approach.

Shamoon, Sherrie. "The Life and Hard Times of the Paperless Office." *Management Technology*, August 1984, pp. 40-43. The promise of the "paperless office" is compared with the paradoxical reality. "Far from dwindling," through increased use of computers, "paper usage is expanding at the speed of printers," Shamoon notes. But new technologies, such as optical storage, may finally stem the deluge, the article suggests. Included is a brief interview with Paul A. Strassmann, former vice president of the systems group at Xerox Corp.

"Shell Oil Company: Team Problem-Solving in a White-Collar Work Environment." American Productivity Center *Case Study #3*, 1980. Describes "Shell's Program for Improvement Recognizing Individuals' Talents" (SPIRIT), 1975-79, at its 1,800-employee Information Center.

"Southern Company Services: Measuring Engineering Productivity." American Productivity Center *Case Study #31*, 1984. Describes a practical approach to the job of measuring "knowledge" workers at a 1,350-employee engineering services firm.

Srivastva, Suresh and Associates. *The Executive Mind*. San Francisco: Jossey-Bass, Inc. 1983. The authors discuss current misperceptions about executives' behavior, analyze psychological and organizational influences on decision-making and planning, and pinpoint obstacles and problems leaders face. They discuss the personal traits that lead to success, show how executive and organizational performance can be improved, and offer new strategies to make management education and career development more effective.

Stephenson, Blair Y.; Hughes, Paula Ann; and Heath, Richard R. "A Structured Approach to MIS Productivity Measurement." *Journal of Information Systems Management*, Fall 1985, pp. 34-42. Step-by-step description of how an MIS department established a measurement system for itself and includes a discussion of difficulties encountered. The final system measures MIS products in terms of their usefulness, integrity, and performance. The department also devised an interesting way of valuing its output in dollars.

Stone, Philip J. and Luchetti, Robert. "Your Office Is Where You Are." *Harvard Business Review*, March-April 1985, pp. 102-117. This well-written, easily read article explains the need for a change in office design from individual offices to offices meant to accommodate various activities. Workers have "home bases" but also ready access to conference rooms, quiet spaces, and "bullpens."

Strassmann, Paul A. "Information Technology: Will It Make the Difference for Management Productivity?" American Productivity Center *Productivity Brief #37*, June 1984. Summarizes the author's data-based research: information technology alone does not improve management productivity.

Strassmann, Paul A. *Information Payoff: The Transformation of Work in the Electronic Age*. New York: The Free Press, 1985. This ambitious book is a "must-read" for managers and others charged with evaluating or implementing electronic information systems. Former Xerox executive Strassmann focuses on the real problems and challenges companies face when trying to unlock the productivity potential of such systems. Samples of his provocative views: "Job design based on excessive specialization is a major cause of unproductive information-handling work." "Office work reflects the way power is distributed." "In the information age, people are assets; it is machines and buildings that should be counted as expenses." The author has done an impressive job of backing up his conclusions with the best of the meager, scattered statistics that exist in this difficult subject area.

Tapscott, Don. *Office Automation: A User-Driven Method*. New York: Plenum Press, 1982. This book explores ways of closing the gap between users and providers of new office technologies. Topics include understanding the problem; concepts of electronic systems; efficiency, effectiveness, and productivity; assessing an office organization from several angles; and designing a system with users in mind. A solid, useful overview.

Tarbex, Frank K. "Value Analysis at Penn Mutual." *Best's Review*, January 1978, pp. 68-72. In this article Tarbex describes the process of value analysis used in his own company, Penn Mutual Life. Value analysis is an effective strategy for dealing with expense reduction and the best use of company resources. Examples of applications in several work areas within Penn Mutual are presented. Costs, benefits, and problems of using value analysis are analyzed. These range from substantial financial savings to temporary morale problems.

Taylor, R. S. "Information and Productivity: On Defining Information Output." *Social Science Information Studies*, Vol. 4, (1984), pp 31-41. A bit academic but well worth reading, this article looks at the difficulties of measuring the benefits of "information outputs." It discusses output characteristics in terms of purpose and direction, scope of the output and product or services. Finally, it presents two approaches to the analysis of benefits.

"Texas American Bancshares: Survey Feedback Program Fosters Communication/Problem-Solving, Yields Improved Employee Attitudes." American Productivity Center *Case Study #4*, 1980. Detailed description of an effort that featured employee surveys, management training, and goal setting. Includes quantitative impact on productivity.

"The Paul Revere Life Insurance Companies: 'Quality Has Value' for Both Employees and Policyholders of Avco Corporation Financial Services Unit." American Productivity Center *Case Study #42*, February 1984. Describes a four-pronged quality improvement effort: quality teams, management teams, surveys, and a cultural change.

Thor, Carl G. "Putting Sales and Marketing on the Charts." American Productivity Center *Productivity Brief #34*, March 1984. How to measure productivity in the sales and marketing function using the family of measures approach. An illustration yields 26 sample ratios.

Thor, Carl G. "Using Nominal Group Technique to Establish a White-Collar Productivity Measurement System." American Productivity Center *Productivity Brief #31*, April 1986. A guide to participative target setting, including essential steps for facilitators, how to use results, and sample measures for an engineering department.

Thor, Carl G. "White-Collar Productivity Measurement." *Productivity SA*, July 1985, pp. 8-11. Pointing out that white-collar workers rarely produce final products, that the nature of their work is usually nonrepetitive and that individual measurement of professional or managerial work is increasingly less applicable, this article explores consequent problems created for measuring white-collar performance.

Townsend, Patrick L. "Insurance Firm Shows That Quality has Value." *Quality Progress*, June 1985, pp. 41-45. A case study of The Paul Revere Life Insurance Companies' Quality Has Value program provides a method that others may find useful.

Vallee, Jacques. *The Network Revolution: Confessions of a Computer Scientist*. Berkeley, CA: And/Or Press, 1982. Anyone wrestling with trying to "justify" or analyze the benefits of electronic information systems will relish the mixture of penetrating insight and anecdotal humor found in this book. It is an engaging cultural-technical account of the growth of computer technology and power from the early 1960s to the early 1980s, as told by a French native, long a U.S. resident, who was intimately involved with that growth. Vallee accurately details "the dream, the nightmare, and the promise of the new information networks" and shows why MISs seldom do what they are supposed to.

Walton, Richard E. "Work Innovations in the United States." *Harvard Business Review*, July-August 1979, pp. 88-98. An authority on work innovation discusses work improvement techniques that result in planned change—that is, an improvement in productivity and quality of work life. Work innovations are not a panacea but represent an approach to looking at problems. Walton proposes his own three-level conception of work innovation, describing how techniques, outcomes, and culture relate and interact. He provides some lessons learned from experience with work improvement strategies.

Walton, Richard E. and Vittori, Wendy. "New Information Technology: Organizational Problem or Opportunity?" *Office: Technology and People*, Vol. 1, 1983, pp. 249-273. This article cites four examples of complex information system installations—a medical records system, a telephone company system, an order processing system, and an insurance company system—done with inadequate consultation with those involved and in ignorance of the probable impacts of the systems. The article describes methods for anticipating and directing the organizational impact of new systems.

"The White-Collar Computer: Changing the Way America Works." *Management Focus*, a publication of Peat, Marwick, Mitchell & Co., May-June 1983. Several articles written by Peat, Marwick consultants deal with: establishing standard oper-

ating procedures for office automation systems; how to avoid sabotaging an automation plan or short-changing the human side of the effort; finding the best software; integrating productivity measures; executive workstations; and coping with the stress of change.

B. Audiovisual Resources for White-Collar Productivity Improvement

The slides, tapes, and films listed on the following pages may be obtained through distributors indicated at the end of each description. A complete, alphabetized list of distributors, including addresses and telephone numbers, begins on page 27.

A Season for the Knowledge Worker

Based on 15 years of research, this videotape shows how knowledge workers' careers develop and what factors determine that development. Four career stages of successful people are described. An introduction traces the history of work, putting knowledge work in a long-term context. 27 minutes. Center for the Management of Professional & Scientific Work.

Brainpower

John Houseman suggests ways to get more out of meetings. 12 minutes. Learning Corporation of America.

Decisions

An in-depth look at how managers make decisions and why they are so often difficult to make. Presents an orderly approach that will increase self-confidence and lead to better decision-making. 28 minutes. McGraw-Hill Training Systems.

Electronic Office

This series explains and explores the revolution in computer use through case studies of both small businesses and large corporations and at research labs of the world's largest computer companies. It examines the implications of the new technology for those who have to use it. 6 tapes. 25 minutes. Films Incorporated.

Entrepreneurship and Leadership in America

Management consultant Warren Bennis interviews two successful CEOs. The responses provide detailed insight into the secrets of effective leaders and how entrepreneurship can be kept alive even in large companies. The program looks at the role of planning and intuition, ways of learning, innovation in marketing, teamwork, and more. 45 minutes. Goodmeasure, Inc.

Goal-Setting

The ability to set and achieve goals is one of the most important personal and professional skills anyone can acquire. This film helps teach those skills, explaining a simple step-by-step process for setting and achieving goals through Management by Objectives techniques. 17 minutes. Salenger, Inc.

In Search of Excellence: Lessons from America's Best-Run Companies

Based on the best-selling book, this videotape explores examples of American business excellence. Investigating management in large and small companies, the tape focuses on three major themes and how excellent companies have benefited from their use. 90 minutes. PBS Video.

Job Enrichment: Managerial Milestone or Myth?

The film presents the important issue of job design and, more particularly, job enrichment as a technique of job design. It defines job enrichment, compares and contrasts it with job enlargement, and evaluates the impact of job enrichment on organizational performance, employee satisfaction, and motivation. 16 minutes. Salenger, Inc.

Labor-Management Cooperation in the Public Sector

What does QWL look like in schools, municipalities, and state government? How is it different from the private sector? What are its roots? Where is it headed in the future? 30 minutes. Michigan Quality of Work Life Council.

Learning to Think Like a Manager

New managers often find their promotions require them to reconsider their work relationships and develop different attitudes and approaches to their work groups. Presents five key characteristics of effective managers: 25 minutes. McGraw-Hill Training Systems.

Managing for Tomorrow
With Peter Drucker

A seminar on training managers to think, question, and develop themselves and others to increase productivity and flexibility and to meet company growth objectives. Five modules discuss managing the knowledge worker, managing innovation and growth, the challenge of productivity and today's employees. Each module, 25 minutes. BNA Communications, Inc.

Managing Change: The Human Dimension

This presentation by Rosabeth Moss Kanter helps managers understand how to cope with and manage change effectively. Kanter offers personal and organizational guidelines for the overall management of a change effort from a shared vision and clear management structure through local innovations and the importance of two-way communications. 33 minutes. Goodmeasure, Inc.

Meeting the Customer's Needs...More Productivity

Useful in orienting new employees as well as providing an overview for managers. Concentrates on the importance of service effectiveness in any white-collar productivity improvement effort. Approximately 30 minutes. Bank of America, Management Services 3208.

Performance Appraisal: The Human Dynamics

Techniques for using employee performance-evaluation sessions to involve workers in mutual goal-setting and the exchange of ideas. This film shows how to coach and counsel instead of simply critiquing performance. 25 minutes. McGraw-Hill Training Systems.

Productivity and Quality-of-Work-Life Program

This audiovisual program presents ideas to identify and remove roadblocks to peak performance, prepare leaders to anticipate and meet challenges of the 1980s, demonstrate why opportunity and power are central to motivation, and guide executives in developing productivity improvement projects with proven payoffs. Seven modules, 13 minutes each. Goodmeasure, Inc.

Quality Circles in Data Processing

Produced by the McDonnell Douglas data processing division, this 30-minute tape provides a detailed description on an ongoing quality circle program in a DP environment. It tracks the evolution of the program and captures the dynamics of actual circles in session. McDonnell Douglas Corporation.

Seven Feet Tall

Motivation and employee involvement programs at Warner-Lambert Co. Good overview of how to develop a productivity program. 30 minutes. Warner-Lambert Company.

The Complete Listener

This seven-videotape course provides practical suggestions for individuals interested in developing their listening and communication skills. Effective in both one-on-one situations and small or large meetings. Boeing Computer Services.

The Decision-Making Series

Three modules show how good decision-makers are efficient and productive and how they contribute creative solutions to difficult problems. Each film can be used alone or with the others in the series. They focus on values and goals, the often-neglected first steps in decision-making and alternatives, and on information—the heart of the decision-making process. 18 minutes each. Xarr Films.

The Power of Listening

Developing effective listening skills will significantly improve individual efficiency, productivity, and morale. This film illustrates the importance of consciously overcoming listening blocks and how

to really pay attention to spoken messages. 26 minutes. McGraw-Hill Training Systems.

The Manager and the Organization
Narrated by Peter Drucker
Author Peter Drucker's six-part series examines office challenges from the supervisor's perspective. Very helpful for new and future managers. Approximately 30 minutes each. BNA Communications, Inc.

List of Distributors

BNA Communications, Inc.
9439 Key West Avenue
Rockville, MD 20850
301/948-0540

Bank of America
Management Services 3208
555 California, 46th floor
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Washington, DC 20024
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213/450-3300

Warner-Lambert Co.
Corporate Communications Department
201 Tabor Road
Morris Plains, NJ 07950
201/540-2000

Xicom Video Arts
Sterling Forest
Tuxedo, NY 10987
1-800/431-2395

C. Organizations Involved in White-Collar Productivity Improvement

Following are nonprofit productivity and quality-of-work-life centers with expertise in white-collar productivity improvement.

American Productivity Center
123 North Post Oak Lane
Houston, TX 77024
(713) 681-4020
Established 1977

A nonprofit company, the Center works with business, labor, government, and academia to improve productivity, quality, and quality of work life. With support from over 200 organizations, it offers knowledge and assistance through a range of resources—conferences, regional meetings, consulting, information services, research, seminars, publications, and computer networks. It is expert in the fields of productivity management, productivity measurement, white-collar productivity, labor-management cooperation, employee involvement, and national policy.

Bureau of Labor-Management Relations
and Cooperative Programs
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210
(202) 523-6098
Established 1984

This Federal Government agency was created to promote cooperative labor-management efforts and enhance the quality of working life, while improving the competitiveness of American industry. It serves as a national repository of information and technical assistance for employers, unions, educators, and others interested in more effective industrial relations practices.

Center for Effective Organizations
Bridge Hall — 400
University Park — MC 1421
University of Southern California
Los Angeles, CA 90084-1421
(213) 743-8765
Established 1979

The Center focuses on issues of organizational effectiveness and design. The objective is to bridge the gap between theory and practice and develop and communicate knowledge about how organizations can be effectively managed. To accomplish this objective, the Center does research with organizations, runs educational seminars, and publishes books and articles. The private sector provides funding. Center projects focus on organization design and development, leadership, work design, quality-of-work-life, labor-management relations, reward systems, and strategic planning.

Center for Human Resource Research
Ohio State University
650 Ackerman Road
Suite A
Columbus, OH 43202
(614) 263-1682
Established 1965

As its name suggests, the Center for Human Resource Research focuses on the "people factors." It offers technical assistance and research to companies in Ohio concerned with employee involvement and quality-of-work-life improvements. Funding is supplied by contracts and government grants.

Center for Productive Use
of Technology
3401 North Fairfax Dr., Rm. 322
Arlington, VA 22001
(703) 841-2675
Established 1983

The Center conducts sponsored research projects on such subjects as quality circle applications, sociotechnical systems design, white-collar productivity measurement, and technology transfer. Its ties with George Mason University enable it to bring together interdisciplinary teams to work on client problems. The Center also develops and uses training packages in productivity improvement awareness, management development, quality circle implementation, and small-group problem-solving processes. It is funded partly by the university but mainly by grants and contracts.

Center for Private Enterprise
Baylor University
Waco, TX 76798
(817) 755-3766
Established 1978

The Center's major activity is economic education programs for teachers, students, and employees. Particular emphasis is placed on public policy and entrepreneurship. Services consist primarily of workshops. The National Center for Entrepreneurship Education, part of the Center for Private Enterprise, works with colleges, vocational and technical schools, and high schools on teaching entrepreneurship. It also works with companies trying to encourage the entrepreneurial spirit among their employees. The Center works primarily in Texas.

Georgia State University
Productivity Center
University Plaza
Atlanta, GA 30303
(404) 658-4000
Established 1981

Managed by the College of Business Administration at Georgia State University, the Center serves as a vehicle for interdisciplinary research on human, cultural, and organizational factors contributing to productivity. A common interest of the 37 faculty members from 15 academic departments and five colleges is measurement models, especially in the white-collar area. Grants and internal university support are sources of funding.

Institute for Productivity, Inc.
592 Hostos Avenue
Baldrich, Hato Rey, PR 00918
(809) 764-5145
Established 1977

The small full-time staff of the Institute for Productivity draws on an extensive network of specialists in various disciplines recruited from public and private enterprise and from academic institutions in Puerto Rico and the United States. The nonprofit organization, funded through contracts and fees for services, does research on the organizational, human, and cultural factors that affect productivity. It also acts as a change agent in companies' efforts to strengthen their participative management approaches. Its services are rendered mainly in Puerto Rico and also in Latin American countries. Its staff is fully bilingual.

National Center
for Public Productivity
John Jay College
of Criminal Justice
City University of New York
445 West 59 Street
New York, NY 10019
(212) 489-5030
Established 1975

As its name suggests, the National Center for Public Productivity is dedicated to the needs of the public sector. The Center's services include training, consulting, technical assistance and information services in the areas of labor-management cooperation, measurement, budget and finance, and national policy. It is funded by grants and contracts, and fees for services and products.

National Training Laboratory Institute
for Applied Behavioral Science
1501 Wilson Boulevard
Suite 1000
Arlington, VA 22209
(703) 527-1500
Established 1947

The Institute produces over 150 public programs and conferences each year in the areas of human relations, training of trainers and organizational development. It also publishes a series of books on related subjects and runs a joint master's degree program in human resource development with the American University in Washington, DC. Funded by fees for programs, the Institute each year conducts a major conference on quality of work life called Ecology of Work.

Productivity Center of the Southwest
1015 Gayley Avenue
Suite 1000
Los Angeles, CA 90024-3401
(213) 208-3596
Established 1983

The Center provides a resource of knowledge and skill for improving productivity in business, public, and nonprofit organizations. It works principally in the southwestern U.S. The Center's resources are concentrated in the area of improving productivity in the white-collar/support services/indirect labor workplace. Services include training, publications, research, and consulting. Funding for the nonprofit center comes from memberships, grants, and fees for services.

Texas Center for Productivity
and Quality of Work Life
Texas Tech University
Box 4320
Lubbock, TX 79409
(806) 742-1537
Established 1979

The purpose of the Center is to strengthen Texas and the country's private and public enterprises by creating and supporting programs that enhance organizational effectiveness and employees' quality of work life. Its services include basic research antidevelopment and action research projects with cooperating organizations. The Center also offers training, consulting, publications, and information services. Areas of expertise include quality improvement, white-collar productivity improvement, organization and job design, manufacturing technology, and labor-management cooperation. Funding comes from Texas Tech University and program and project support from public and private sources.

U.S. Department of Commerce
Productivity Center
U.S. Department of Commerce
Room 7413
14th Street & Constitution Ave., N.W.
Washington, DC 20230
(202) 357-0940
Established 1981

The U.S. Department of Commerce Productivity Center is an information clearinghouse that provides publications, articles, references, referral services, and reading lists on a variety of productivity-related topics. The clearinghouse spans the gamut of productivity and quality-of-work-life topics and draws on the expertise of the U.S. Office of Productivity, Technology, and Innovation.

Work in America Institute
700 White Plains Road
Scarsdale, NY 10583
(914) 472-9600
Established 1975

Work in America Institute focuses its research, publications, and consulting on workplace issues ranging from quality of work life to work practices and worker demographics. The organization also offers productivity and management assistance and training. In addition to its monthly newsletter, the Institute publishes books and studies and serves as a clearinghouse of information. Funding sources include contributions, grants, and fees for products and services.

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Washington, D.C. 20210

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